

REMARKS

Upon entry of the foregoing amendment, Claims 1, 4-7, 9-11 have been amended to more particularly point out and distinctly claim that which Applicants consider to be their invention. Claims 2 and 3 have been cancelled without prejudice. Support for such amendments exists throughout the application, and no new matter has been added. Therefore, Claims 1 and 4-12 remain pending in this application.

Claim Rejection Under 35 USC 102

Claims 1-12 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,772,633 (Terry, et al.). This rejection is traversed and reconsideration and withdrawal of the rejection in light of the remarks and amendments made herein is respectfully requested. Further Applicants reserve their right to present evidence removing Terry as a 102(e) reference.

Claim 1 has been amended to include the subject matter of Claims 2 and 3, as well as distinctly claim the type of manufacturing equipment to which the invention applies. Thus, Claim 1 is now directed to a semiconductor substrate chamber processing tool, wherein the fingerprints are vectors representing deviations from nominal values of sensor data, and are substantially invariant across all tools of the same nominal type running the same nominal process. In addition, a plurality of sensor data is provided which is sensitive to both tool-state and process-state changes. This invention, as claimed, is nowhere disclosed or suggested in Terry et al.

Terry et al. disclose an acoustic-based diagnostic system. The sound of a device in various states of malfunction are recorded and stored in a database. When

a fault occurs on a particular device, the sound it makes is compared with the recordings in the database in an attempt to determine the fault.

There are significant differences between the disclosures made in Terry et al. and the present invention. First, the techniques disclosed in Terry et al. can only work if the device is noisy in operation, such as is the case with office machinery, (the application taught by Terry et al.) More specifically, the technique taught by Terry et al. is only operable if the noise the equipment makes when faulty is different to the noise it makes when operating correctly. By contrast, semiconductor substrate chamber processing tools are essentially silent in operation, and faults do not generally manifest themselves as acoustically detectable changes. Therefore, an acoustic-based diagnostic system would be useless for diagnosing faults in an essentially silent semiconductor processing tool. As a result, Applicants respectfully submit that Terry et al. is an inapplicable reference, as one skilled in the field of semiconductor substrate tool processing would not look to the teachings of Terry et al. for the reasons stated.

Furthermore, Terry et al. discloses the use of only a single sensor data (sound from a microphone). The present invention, as now claimed, uses multiple sensor data, sensitive to both tool-state and process-state changes. The use of multiple sensor data is nowhere disclosed or suggested by Terry et al.

In addition, in the present invention as claimed, the sensor data is stored in the form of vectors which represent the deviation in magnitude and direction of sensor data from nominal values. As discussed in the specification, even semiconductor processing tools of the same nominal type running the same nominal process can have substantially different absolute sensor data. Thus, a comparison of raw sensor data would not necessarily yield meaningful results. However, the importance of using vectors representing deviations from nominal values is that such vectors are substantially invariant across different semiconductor processing tools of the same nominal type running the same nominal process.

This problem does not arise in the case of acoustic-based diagnostics. Terry et al. disclose their assumption that similar faults will give similar (absolute) acoustic signatures; thus there is no need to derive vectors representing deviations from a nominal state. Indeed, in the case of acoustic recordings it is not clear how such vectors could be generated. In any event, Terry et al. nowhere disclose or suggest the use of vectors as defined in Claim 1, (e.g. representing magnitude and direction of deviations from nominal values), and the Office's assertion of the equivalence of vectors with sound fields is not understood. Indeed, a more detailed explanation of the Office's comment in this regard is requested.

In light of the above, we submit that the person skilled in the art would never consider the acoustic-based diagnostic system of Terry, et al. as being relevant to the substantially silent semiconductor processing tool of the present invention. Accordingly, we submit that the claims as amended are patentably distinguished over the cited art.

Further, Applicants respectfully submit that the Amendments made to the Claims render the pending rejection moot. Applicants reiterate their intention to reserve the right to have Terry, et al. removed as a proper reference under 35 U.S.C. §102(e).

Finally, the drawings objected to by the Office have been corrected and are being resubmitted concurrently herewith. Reconsideration and withdrawal of the drawing objection is therefore also respectfully requested.

Amendment and Response
Ser. No. 10/791,132



CONCLUSION

In light of the foregoing, it is respectfully submitted that the pending Claims 1 and 4-12 are in condition for allowance and prompt issuance of the Notice of Allowance is respectfully requested. If there are any issues that can be resolved via a telephone conference, the Examiner is invited to contact the undersigned at 919-420-1734.

Respectfully submitted,

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